Neural Reactivation After a Month-Long Delay for Word-Concept Associations
Heather Bruett¹, Regina C. Calloway¹, Natasha Tokowicz¹,², & Marc N. Coutanche¹,²
¹Department of Psychology, University of Pittsburgh
²Learning Research & Development Center, University of Pittsburgh

INTRODUCTION

- Concepts' neural representations can differ between item and category levels.
  - These dimensions can be remembered differently.
- Neural computations during encoding (pattern robustness: pattern separation, global similarity), as well as representational consistency between encoding and retrieval (pattern reinstatement), can predict future memory performance (1-4).
  - Pattern separation: incoherence between patterns
  - Global similarity: coherence between patterns
- Can patterns within encoding trials and between encoding and retrieval predict subsequent memory performance?
  - Even with perceptual changes?
  - Even after a long delay?
  - That differ between item and category levels?

METHODS

- 22 subjects recruited; final N = 18 subjects, female = 14, male = 8; Age: M = 25.3
- Learning: 20 pairs, each studied 8 times (2 runs)
- Cued Recall: 20 pairs, each presented once
  - See image, type word [5]
- Recognition (d'): 20 pairs tested, each tested 12 times (3 runs, 6 trials match, 6 mismatch)
- Item and category level analyses

Pattern Robustness (1,4)
- Positive = pattern separation
- Negative = global similarity

Pattern Reinstatement (1)
- Positive = reinstatement

RESULTS

- Similar regions are involved in representing pattern separation and global similarity patterns that can predict memory at item- and category-levels.
- Pattern reinstatement patterns that predict memory performance are differently represented in item- and category-level processing.
- We show evidence that semantic concept dimensions can sometimes diverge in where they are represented, and this can have behavioral consequences. We highlight the need for concepts to be examined at multiple levels of semantic granularity.

CONCLUSIONS

REFERENCES


ACKNOWLEDGEMENTS

We would like to thank the Learning Research and Development Center Internal Awards Program for funding this project. We would also like to formally acknowledge our lab coordinator, John Paulus, graduate students, Griffin Koch and Xueying Ren, and our lab’s research assistants for their support and assistance with this project.

CONTACT

Heather Bruett: heb52@pitt.edu
Coutanche Lab: http://www.thelenslab.org